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duction the author points out the dependence of our higher mental activities on the materials furnished by our sense organs. Light, heat, sound, materials of taste and of smell, and direct external contact are the stimuli for the eye, ear, tongue, nose, and outer skin. These, the author declares, are all the forms of sensory stimuli and sense organs known. How such a statement is consistent with the author's opinion as to the source of all our mental materials is difficult to understand, unless he be a man to whom pain, fatigue, hunger, and thirst are unknown.

The relation of sense organs to the medium in which the animal lives is next taken up. Organs of taste and touch are equally possible to water- and air-inhabiting animals, but organs of smell, hearing, and sight are of necessity more restricted to the air-inhabiting forms. Smell, the author believes, is absolutely impossible to water animals, though he offers no explanation of the condition in fishes where the organs which become olfactory in the air-inhabiting vertebrates are so well developed.

The remainder of the lectures is devoted to a condensed account of the sense organs of the animal kingdoms. The so-called vegetative senses — touch, smell, and taste — are first considered, and then what are dignified by the title of animal senses — hearing and sight — are dealt with. Practically nothing novel is introduced in this part of the work, the first portion reading like an abstract of Jourdan's *Senses and Sense Organs of the Lower Animals*, and the second being in large part avowedly taken from Carriere's little book on the eye. The popular treatment of a scientific subject is one of the most difficult tasks an author can set for himself, and to prescribe rules for such forms of composition is well-nigh impossible. Superficiality, however, is never to be tolerated, and superficiality is the characteristic of Dr. Steffan's contribution.

G. H. P.

Eckstein's Zoologie.[1] — The German medical student has to pass examinations in zoölogy and comparative anatomy, and as a result a number of these compendia exist, apparently intended to enable the student to cram for examination. We are familiar with several of these syllabi, and this of Eckstein seems, on the whole, the best. It contains a large amount of information, clearly arranged under the heads of history, histology, comparative anatomy, physiology, embryology, paleontology, geographical distribution, phylogeny, taxonomy, and the relations of animals to human interests. The book is well illustrated with two hundred and eighty-one cuts, none of which indicate the source from which they were copied.

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[1] Eckstein, Professor Dr. Karl. *Repetitorium der Zoologie, Ein Leitfaden für Studierende.* Zweite Auflage. Leipzig, W. Engelmann, 1898. 8vo, viii + 435 pp.

Crustacea of Norway. — We wish to call attention to the valuable work by G. O. Sars[1] on the Crustacea of Norway, of which the second volume, treating of Isopoda, is now current. Every species is figured, often an entire plate being devoted to the figures of the entire animal and enlarged views of appendages. The text contains a brief description of every species, with valuable remarks on occurrence and distribution, and with synonymy. The last parts have treated of the Oniscidæ (wood lice, etc.), which have a special interest as being the sole large group of terrestrial Crustacea. From the fact that North American Crustacea closely resemble the Norwegian ones this work is of great value to American naturalists who are not regardless of the need of carefully identifying the species they study.

Japanese Pulmonates. — Dr. Jacobi[2] has made a thorough anatomical research on twenty-eight species of Japanese shell-bearing Pulmonata belonging to the genera Helecarion, Conulus, Ganesella, Helix, Eulota, Acusta, Euhadra, Plectotropis, Ægesta, Eulotella, Tristropeita, Slercophædusa, Bulimus, Succinea, and Limnæa. This is conscientious work of a much needed kind, unfortunately limited to alcoholic material; a compact mass of information, free from generalizations. The plates are excellent.

F. N. Balch.

Brooding in Frogs.—The singular brooding habits of a small frog, *Arthroleptis Seychellensis*, from the Seychelle Islands, are described by Professor August Brauer in the current number of Spengel's *Zoologische Jahrbücher*. The eggs are laid in damp places on the ground, and are kept covered and moist by the male until the larvæ are hatched, which occurs at the stage when they are provided with a long tail, and the first traces of the posterior appendage make their appearance. After hatching, the tadpole-like larvæ crawl upon the back of the male and attach themselves by the abdomen by means of secretions elaborated both by the larvæ and the adult.

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[1] Sars, G. O. *An Account of the Crustacea of Norway*, vol. ii, Isopoda. Bergen, published by the Bergen Museum, 1897 and 1898.

[2] Jacobi, A. Japanische beschalte Pulmonaten, *Jour. Coll. Sci. Imp. Univ. Tokio*, XII, Pt. I. 102 pp., 6 plates.